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THE question of tenement houses has been growing upon the people of New York, till it has become the prominent social topic of the hour. Many meetings and addresses have been given to it since the clergy of the city set apart their special Sunday for its discussion, and the interest aroused in it led to a mass meeting, which was held a week ago at the Cooper Institute, to set going a movement for reform. The meeting was very large and earnest; the mayor presided, and the list of men of marked public and social influence among the vice-presidents and secretaries showed that the movement was taken up by those who were best able to devise and execute a reform, so far as one is practicable. What means will be found we have yet to see. The speaker who offered distinct suggestions of what could be done was Mr. Joseph H. Choate, who suggested that two hundred men should give five hundred dollars each, or half as many a thousand each, to build a model tenement house, after the example of Mr. Peabody in London, arguing that the only way to a successful reform was in showing "that tenement houses can be built good enough for any man to live in, rented at low prices, and yet money be made," and so by competition compelling the builders of the common tenement houses to raise their standard. The statistics given out in this and other meetings set forth the need in an impressive light. It is declared that half a million people in New York, half the city population, live in these houses, of which there are twenty thousand, large and small, in the city, and that in some districts as many as eight hundred people live on an acre of ground. The hope has been held out that the elevated railroads will tend, by making it easy for workmen to get back and forth, to tempt their families away from the crowded points of the city, but we doubt whether this will accomplish much in the face of the tendency of poor people to crowd together. The only real hope of amelioration seems to be, as Mr. Choate argued, in example and competition, and the question is, Will capitalists enough be found who will so place their money and take such pains as to make their competition effective?

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As we go to press we learn that the committee of award in the tenement house competition instituted by the *Plumber and Sanitary Engineer* has adjudged the prizes as follows: First prize, $250, to Mr. James E. Ware, New York. Motto, "Light, Air, and Health. C." Second prize, $125, to Mr. Henry Palmer, New York. Motto, "Kensington." Third prize, $75, to Messrs. D. & J. Jardine, New York. Motto, "*Ut Prosim.*" Fourth prize, $50, to Mr. William Kuhles, New York. Motto, "Peter Cooper."

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IN June of last year, and in answer to the appeal of Mr. Eads for relief from the terms of his contract for the jetties at the South Pass of the Mississippi, Congress passed a bill, which, authorizing the payment of the second million of dollars under the contract, in advance of the stipulated conditions, directed the appointment of a special board of army engineers to examine the condition of the jetties, and report upon their progress; the probable cost of completing them; the results which have already been obtained by them, and those which may be expected o follow; the probable permanency of the works; and a visability of any modification of Mr. Eads's contract, whether touching the dimensions of the channel required, or the terms of payment. This board, consisting of Gens. Barnard, Macomb, Tower, and Wright, and Col. Merrill, convened in last December, and having made its examination of the jetties in January, at the end of that month rendered its report to the Secretary of War. From the report, which our readers will find given almost in full in the March number of *Van Nostrand's Engineering Magazine*, we extract the main conclusions. The contract on the part of the Government, we will remind our readers, was provisional, Mr. Eads, or the South Pass Jetties Company, which he represents, being required to do the work at their own risk, no payments becoming due until the depth of the channel had increased to twenty feet (from nine on the bar before the work began), and an additional payment being then made for every two feet gained, the full amount of five and a quarter millions being paid only on condition that the depth of thirty feet on which Mr. Eads counted should be secured and maintained for twenty years, over a channel of three hundred feet wide.

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IN regard to the progress of the work, the Board reports that of the twelve thousand feet (nearly) on the east side, and eight thousand on the west, which were the originally intended lengths of the jetties, all but about three hundred feet on each side has been laid and brought up once to the level of high water, a cross dam, the so-called Kipp-dam at the head of the pass, being also built, to narrow the pass to the desired width of seven hundred feet between the jetties. Brought up *once*, we say, because from compression and the natural settlement of the soft bottom under the weight, which indeed was expected, there has been a subsidence, increasing toward the seaward ends, so that the last fifteen hundred feet or so of both jetties are overflowed at high tide, the extremities being some three and a half feet under water, while the shore ends are a foot or a foot and a half above it. On account of the great increase of this subsidence on the soft material of the bar, the ends of the jetties, which were to have been carried well over the bar, have been stopped, as we just mentioned, the eastern on the crest and the western two hundred feet short of it. The jetties are built, substantially like the Dutch dikes, of alternate layers of willow fascines or "mattresses," and of stone or gravel, the whole resting on a broad foundation of mattresses. When finished they are to be covered with a rounded paving of rip-rap stone, the outer quarter of a mile being finished with a concrete capping in large blocks, and a thousand feet within this being protected by a low crowning-wall of rubble masonry. Besides the jetties themselves there are several temporary lateral dams and two permanent "training walls" to deflect the current among the shoals at the head of the pass into the desired channel; and "mattress-sills," as they are called, that is, courses of mattresses loaded with stones, have been sunk across the heads of the southwest and southeast passes, to diminish the escape of water through them. In these various works there had been consumed, up to November 1, 1878, 452,000 cubic yards of mattresses, and 65,000 yards of stone, mostly small stone. For the completion of the work so undertaken, Mr. Eads's estimate is three hundred and fifty thousand dollars, nearly, and the Board thinks this likely to suffice if no extraordinary contingencies occur. Of the permanency of the works the Board is hopeful, notwithstanding the fears that have been expressed of danger from the sea, from decay, and from the *teredo*. The injuries of the teredo are likely, the report says, to be confined to the exterior of the mattress courses at the outer ends of the jetties, while the condition and construction of the work makes it reasonably secure against the other dangers; but there will doubtless be occasion for more or less renewal of height to make up for the subsidence that must continue for the present, — how long, the Board does not venture to estimate.

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FOR the results of the work thus far the Board reports that, although the maximum depth on the bar had been reached in December, 1877, when it was 23.7 feet, and from this it had in December, 1878, diminished to twenty-three feet, there had been on the whole a "constant progressive general improvement in the jettied channel." There has been, during the year, a general increment in depth of about two feet for the last mile of the channel and more, giving twenty-four feet of water for the whole distance, except for about sixty feet at the crest of the bar

(whereas before the jetties were built the water shoaled to about nine feet for the last half mile), and affording a channel width of two hundred feet throughout, and three hundred for most of the way. The depth of twenty-five feet extends almost as far, and makes almost as wide a channel as the twenty-four foot depth, and there is twenty-six feet for all but about a thousand feet in length. The scouring action on the shoals at the head of the pass has apparently been somewhat diminished by the works below. The depth of water, which was originally fourteen or fifteen feet, has been increased to twenty-two; but the bank between the depths of twenty-four feet, above and below, has increased during the past year from three hundred and fifty feet wide to eight hundred, the greater part of the increase being down stream. This the engineers mention as an unfavorable result. Mr. Eads's hope of counteracting it is in raising the sill of the Southwest Pass by additional mattresses; but that this measure alone will prove sufficient, the engineers have not, they say, full confidence.

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Of the results to be expected in future the report speaks encouragingly, though probably less encouragingly than Mr. Eads would wish. The full effect of the jetties has not yet been shown, because in their incomplete condition there is a great escape over and through them of water whose scouring effect is needed in the channel. Captain Brown, in one of his official reports, has estimated this waste at twenty per cent of the whole flow into the pass. Mr. Corthell, the engineer in charge, estimates it at twenty-five per cent. The immediate effect of some of the works at Grand Bayou, and above the pass, has been to diminish the water that enters by ten or twelve per cent. With the restoration of the flow and the completion of the jetties, the board thinks there is reason to expect that a channel of twenty-five or twenty-six feet may be maintained; they do not see reason to look for the attainment of the thirty-foot channel anticipated by Mr. Eads and the engineers who first reported in favor of his project. It has been argued not only that the natural advance of the bars will make it necessary to add to the length of the jetties from time to time, say once in ten years, but that the jetties themselves will accelerate this advance. On this point the Board reports that, so far as observation has yet shown, the effect of the jetties is really to retard if not to check the advance. Finally, in answer to Mr. Eads's appeal for a modification of his contract, and for an acceleration of payments, the Board decides that it is premature to recommend as yet any changes in the dimensions of the channel required, or any further immediate payment; but it advises an advance of a quarter of a million of dollars for carrying on the work, and suggests that, in view of the real benefit to commerce of every foot gained in depth of channel, a change be made in the conditions of payment so as to allow an additional sum for every single foot gained, instead of every two feet.

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One can almost fancy the long-suffering Chicago Court House, — if it ever finds itself finished, of which there seems now to be a chance, — asking itself, like the good old woman in the nursery tale, if this be really I. The divided dome having been at last suppressed by the triumphant city, and the foundation which the county had laid for it having been pulled away with cost, the "rotunda," which was to have taken its place being also done away with, and the cross-building which was to have carried it having sunk into a mere gallery connecting the two wings, there was not much left to do in the way of razeeing. The municipal tinker has just given the last snip to the petticoat by passing, in concurrence with the county, a resolution that the height of the connecting arcade shall be reduced, omitting everything above the arcade itself; that then the entablatures and rear walls of the wings above the arcade shall be finished separately, to avoid emphasizing the conflict in color of the two kinds of stone of which they are built; that the caryatids, and sculptures of the attic shall be replaced by pilasters; and, as we are told, that the top of the balustrade (meaning, we suppose, the balustrade itself), shall be omitted and its base retained as a blocking course. There remains to be decided the question of what material shall be the arcade which is to connect and harmonize these two wings of discordant color. It is expected, they tell us, that red sandstone will be chosen. This, as a medium of reconciliation between two buildings, one of a yellow-white stone and the other bluish white, and thus a pledge of harmony between town and county, is greatly to be admired.

During the past week the papers have given accounts of three casualties which will illustrate in three different ways the recklessness of danger to life and property with which our people do their mechanical work and carry on their vocations. The first is the fall of one span, a hundred feet long, of a railroad bridge, under an empty train. Happily no lives were lost, and so there will be no public inquiring to point the lesson of the disaster, an immunity which is due only to the fact that the bridge did not hold out long enough for the next loaded train to get upon it. The second occurred in Stockton, Cal., where some two hundred persons had gathered in the street to watch the working of a new steam pump, run by an old engine. The steam-gauge was out of order, and the engineer, having screwed down his safety-valve, went on with his work, till the boiler exploded with a force that drove it through the crowd of people like a catapult, killing twenty-six of them and injuring many. The engineer, who was punished for his exploit by being blown to pieces, is said to have answered, when some one remonstrated against his use of his machine, that it "would either work or burst." The third case, and not the least painful of its kind, was the burning of a stable in New York, by which fifty horses were burned at once. The stable was in the heart of the fashionable quarter of New York, and surrounded by costly houses, and yet was built, as stables usually are, so as to be a mere fire-trap. The floors were of wood, of course; the horses were in the basement and in the second story, the ground-floor between being used for carriages. Runways of plank led up and down, for the horses to ascend and descend by, screened off from the rooms and from the wooden stairs by simple board partitions. The building burned very rapidly, and it was found impossible to do anything with the horses, which broke loose and rushed over each other in ungovernable terror. The doors were opened, and an iron lifting-gate which closed the entrance was raised, in the hope that some of the horses, at least, would find their way out; but the ropes that held the gate soon burned off, and it fell, and there was no escape. The disheartening reflection is that there are probably hundreds of such bridges all over the country, waiting their turn to fall; thousands of such unsafe engines, controlled — or uncontrolled — by such incompetent engineers; thousands of stables equally inflammable, likely any night to burn themselves and their contents. We do not know whether underwriters are in the habit of insuring horses against fire; if they are, we may presume that their premiums are high.

## ARCHITECTURAL STUDENTS.

### METHODS OF STUDY.

The letter from "Young Architect," which we print on another page, asks questions which are often asked, but are not very easy to answer in a way to satisfy the inquirers, chiefly because nobody has undertaken the labor of making provision for such cases as his. There is no such thing as an English architectural curriculum. There has never been even a serious attempt in England to establish an architectural school of any importance, we believe; certainly no such school exists. The American schools have arranged for themselves such courses of study as they found practicable, their efficacy depending more on the knowledge and judgment of their instructors than on any text-books or systematic arrangement of appliances for study that could be prescribed for solitary students. There is not in our language any series of books that can be warmly recommended as text-books for architectural students; nor has anybody, as far as we know, been at the pains to select and classify such examples, or to provide such illustrations of them as should lead them through their preliminary studies.

This necessarily makes progress difficult to students who try, by private study, to train themselves beyond the point to which their office experience would bring them, and makes the course of the solitary student a peculiarly perplexing one. To prescribe a course of private study which shall be satisfactorily direct and efficient, orderly and comprehensive enough, would be a pretty difficult task, and would require a good deal of thought. When it was done it would probably look somewhat discouraging to a beginner, for a good knowledge of architecture is not to be had without long and hard work, any more than a good knowledge of any other profession. But something may be said by persons who have considered the question of architectural education which will be a help at starting to those who are struggling at a disadvantage, as every one is who is trying to fit himself for a profession without regular tuition. We hope that

some of our readers who are better qualified to advise than we may have something to say in answer to our correspondent's questions; meanwhile we will call his attention to a series of articles addressed to architectural students, which we published in various numbers of this journal, from September, 1876, to March, 1877, of which the most apposite to our present questions are Nos. IV., V., VII., and VIII.; and will offer some further suggestions which seem to us likely to be of use to many students.

Let us say in the first place that most of them need to be told how to study quite as much as what to select for their studies. Though there is a great choice in what they shall read, it is still more important how they will read it, — using "read" in a sense broad enough to include their study of illustrations as well as of books. Before we venture to offer a list of books to be read (which shall not be very long), except so far as they may suggest themselves in illustration of our discussion, we will say a word as to the way in which they should be used, and concerning general methods of study. And we will risk the repetition of some things upon which we have touched before, because they will be clearer for further illustration and because they cannot, we think, be kept too prominently in mind by the learner.

The pencil (or the brush) is the architect's chief educational reliance, not merely for learning to draw, but for all his after study. Just as the literary worker makes notes of what he reads, pen in hand, for use in his work; so the architectural student should constantly make sketches not only of what he sees about him, but of whatever is illustrated in the books he reads. This is his means at once of training his sense of form and proportion, of storing his memory with forms, and of learning to think architecturally. It is not enough, then, that he uses his pencil sufficiently to become, as our correspondent says, a fair draughtsman; he must use it incessantly as his means of study till it becomes his ready instrument of thought. Let him read, then, with his pencil and paper beside him, and make it his habit to draw or sketch constantly whatever he finds that is most interesting in his illustrations. When he has not time to draw, he can trace, which is also serviceable, but he had better be in the habit of drawing, and especially of sketching from memory, the parts of his illustrations which he thinks most valuable, and omitting the rest, — only being very careful of two things, that he does not lose himself in details when it is really the general aspect of a whole that attracts him, and that he corrects his sketches or memoranda by after reference to the originals. He ought to make up his mind to a great deal of this sort of work, the more the better, so long as he does not allow himself to do it carelessly, and when he has acquired the habit of it, he will find material everywhere. It will be of the greatest service in strengthening the faculty, perhaps more important to him than any one other, of discriminating just what it is that gives to what he sees its interest and value, and of winnowing it from what he does not want. The things that he only sees will make a certain impression on his mind, but to remember them with precision or analyze them with certainty he must draw them. In doing so he will see many qualities in them that otherwise would escape even a careful examination, and if he draws from memory, as he should constantly, he will soon recognize the difference between a loose knowledge and an accurate and serviceable one. And if skill in the use of his pencil is necessary for these things, it is yet more necessary when it comes to giving shape to his own ideas. If an architect is to do his designing himself, and not by deputy, he must have actual skill in determining and expressing beauty of form and proportion, and for acquiring these no other means is worth a rush. We take frequent occasion to insist on this doctrine, because though it may be taken for granted as a theory, it is greatly neglected among us in practice. One of the reasons of the inferiority of American architecture is that its designers lack, not the ability to make a sufficiently creditable sketch or drawing of their work, but the sensitive eye of the really skilful draughtsman.

As soon as possible he should emancipate himself from dependence on scales and T-squares, and train himself to make sure of his proportions by the help of the eye alone. We say, by the eye alone. This is a point of the very first importance, not only at this stage of his work, but at every subsequent stage, and more than all when it comes to designing. Until the architect's command of proportions and adjustments is absolutely independent of scale and measure he cannot design with freedom and power, but is always in trammels. The writer of this article remembers being urged by the first architect with whom he studied, before there were any architectural schools in the country, to get the habit as soon as possible of working by scale. He did so, and it was some years before he recovered the ground lost by too implicitly following this counsel, which cut him off from acquiring the firmness of judgment and security of proportion that come with a well-trained eye. Drawings which are made for service, and finished designs, must of course be drawn accurately to scale. The architect, in translating his designs, so to speak, for execution, must be able to think in accurate dimensions, must know the effect of feet and inches and quarters of inches in the executed work, and must be able to take these things into account in learning the practical lessons of actual examples. But he should cultivate from the beginning the power of perceiving and fixing the proportions of his design by the relations of parts to each other, without dependence on actual magnitude, and of adjusting them by his own perception without mechanical aids. We have heard it said of no less a musician than Schumann that he injured his power of composition, or at least the freedom of his conception, by his habit of composing at the piano; the architect who cannot conceive and sketch his design securely without the help of scales and modules is like the musician who cannot compose away from his instrument.

It is well that the student should adopt one special procedure, to be fixed in his mind as a habit and followed wherever it is possible in all his future work. That is, he should not build up his drawing or his design by piecing one thing on to another; but should lay out at once his gross dimensions, and then divide and subdivide, proceeding always from the greater to the less. Thus in setting out his order he should first fix the whole height, then divide it into column and entablature; then the entablature into its cornice, frieze, and architrave, the column into shaft, base, and capital, and then subdivide these into their proper mouldings. The same proceeding should be followed in all his drawing or subsequent designing, whether done by the eye or by measurement, — first the mass, then the division, then the subdivision, and last the detail, each being made sure before the next is touched. Such a habit will have a greater influence on the student's mind and work than he could anticipate. It is too apt to be passed over as if it were merely a matter of the convenience of the moment, but it really affects the whole mental growth of the designer. It will be likely to lead to all the difference between a mind that is attentive to the broad relations of things, and therefore has the power of combination, subordination, and proportion, and one which is at the mercy of its detail.

The student will soon find, in fact, what everybody who has had occasion to supervise young draughtsmen has had reason to notice, that it is not safe, even for accuracy, to lay out so much as a group of mouldings by piecing one member upon another successively, and that if he does so, the accumulation of imperceptible errors will probably end in throwing the whole out of relation. He will gradually make the discovery that though measures are most accurate for considerable magnitudes and single dimensions, there are many cases, especially in grouping of members and in defining forms, where the trained eye is much more trustworthy, and must be on the watch to correct the instrument. The reason is simply that while the compasses can take account only of absolute dimensions, the eye perceives relations, which are more important. We have sometimes found it almost an impossibility to open the eyes of a draughtsman to these relations when he had sealed them by beginning in the wrong way.

So much we will say by way of preliminary, leaving certain more detailed suggestions for a later article.

## THE PLUMBING IN A FIRST-CLASS BOSTON HOUSE.[1]

### I.

Two special characteristics of the sanitary condition of Boston have made a sensible impression on the plumbing work which is usual in the better class of houses in the city. A part of the town lies very low, so that the sewers which drain it are little above the level of low tides, and as the rise and fall of the tide is very great, the compression of the air in the sewers from this cause is considerable, and the long stagnation of their contents favors the generation of gas, so that the back pressure is often sufficient to force the house traps, and the utmost precaution of vent-pipes and valves is found necessary, to prevent the air in the houses from being contaminated, and the plumbers are glad to adopt the best modern devices for cleanliness and security.

[1] Read at the Twelfth Annual Convention of the American Institute of Architects by Mr. T. M. Clark, A. A. I. A.

Another habit which has always been very general in the city is that of supplying the house pipes from a tank in the attic, fed by a rising main from the street pressure and provided with a ball-cock. Perhaps the inequality of surface, which brought a considerable part of the houses so high that in former times the water would flow into them only at night, when the consumption at the lower levels was reduced, may have made familiar a system which those who from experience had learned its superiority in the distribution of water through the house pipes have not been willing to abandon, although the necessity for it no longer exists.

In the application of these principles, the Boston plumbers practise certain refinements that are, so far as I know, peculiar to themselves, and which, it is no discredit to say, apply rather to the concealed working parts rather than to the ornamentation of stone-ware or plated work, in which the local taste is perhaps more sober than elsewhere. Some of their devices may not merit the full approval of a scientific engineer, but as attempts to meet certain wants they are at least interesting. An easy way of obtaining a connected idea of their mode of work, which can be compared with that practised in other localities, is to describe a typical house, one of many lately built or now building, mentioning particularly those details of workmanship which have most recently come into use.

Our house is liberally supplied with apparatus: three baths, five water-closets, six wash-bowls, and three slop-sinks are provided, besides the usual soapstone sinks, wash-trays, pantry-sinks, etc. The bath-rooms are in the middle part of the house, but on opposite sides, those on one side opening from the front chambers, and those on the other from the rear, and a well on each side affords a dim light.

Beginning in the cellar, we find a four-inch soil-pipe descending on each side nearly to the floor, then changing to five-inch they run along the wall to the rear of the building, where they join, and continue, still five-inch, through the cellar wall, and some distance beyond, to the earthen drain-trap. A four-inch iron pipe, running up independently inside the house, and opening above the roof, connects with the five-inch drain just at the cellar wall. This supplies fresh air to the bottom of the soil-pipe in the only way which would seem practicable in our climate. The English, with the same object of securing a circulation of air through the whole length of the soil-pipe, connect with it at the bottom a ventilated trap, opening at the ground level, outside the house wall. This satisfies them, but appears not to have succeeded very well here, and the plumbers, while accepting the principle, consider it necessary to carry up the inlet pipe where there will be no risk of cold air descending to freeze the trap, or of foul air issuing under the noses of the passers-by. The drain is made of iron for ten or twelve feet beyond the wall, on account of the danger from settlement of the ground, which in the new part of the city often breaks off earthen pipes close to the line of the building, and every second length is connected to the adjoining one with a Y-branch, the oblique arm of the Y being uppermost, with a round piece of sheet-lead cemented in, so that by cutting out the lead access may be had to the drain every ten feet, for clearing out obstructions. The vertical soil-pipes run up in chases eight inches by eight inches, formed in the brickwork, and the space around them is built up with pieces of brick and cement. All the iron pipes are painted with red lead.

On the cellar ceiling run all the pipes which are required to go from one side of the house to the other, none being allowed to cross the floors above. On one side, the stack of pipes ascends through the butler's pantry, with a board casing; the opposite stack, which passes through the principal rooms, runs up from the cellar behind the furring of a chimney-breast, and access to the pipes is managed by an opening framed in the beams of the cellar ceiling, and a ladder, made by nailing cross-pieces to the inner side of the studding which forms the breast. In the kitchen and laundry all the pipes are exposed, and all consist of brass tubes. The cold water tubes with their fittings are tinned inside, but those for hot water are plain, on the theory that the hot water, by its constant circulation through the cast-iron water front and over the galvanized bands of the boiler, acquires a taste which will always prevent its use in cooking, so that special precautions are not needed for it, while cold water pipes should be protected wherever there is any possibility of water for drinking or cooking being drawn from them. As only tubes are made with the coating of tin on the outside as well as the inside, the plumber has taken the trouble to scrape off all the outer coating, to make them look like the others. The brass tubes are used for hot water throughout the building, but for cold water only where exposed, lead pipe taking their place elsewhere.

The wash-tray wastes are trapped with one six-inch round-trap, into which the three waste-pipes are entered, all of them below the water-line, to prevent circulation of air from one tray to another. In the stories above, a similar mode of trapping is followed; wash-bowls, pantry-sinks, and baths are fitted with round-traps, four, five, or six inches, and the overflow and waste-pipes are separately entered below the water level, so that the circulation of air down the waste and up through the overflow into the room, or in the reverse direction, bringing with it in either case the smell of the decomposing slime which lines the waste-pipe, is completely cut off. The round-traps are suspended between the beams, so that the brass screw is flush with the floor, only the hexagonal projection for the wrench rising above the surface, and the overflow and waste-pipes are carried down at the back of the space beneath the bowl, so as to leave practically the whole of this space available for a cupboard, without lessening the accessibility of pipes and trap.

The water-closets are of the pan species, to which all plumbers are so much attached, but they are the best of their kind. The inside of the receiver is enamelled, and even the pan is improved by having a round piece of porcelain, some four inches in diameter and thick enough to be in no danger of breaking, cemented into the bottom, so that when the pan is at rest, nothing but porcelain appears in the bowl. Each is supplied from a service cistern, with lever and cistern valve. A one and one half inch brass coupling is inserted in the top of the receiver, and to this is attached a ventilation pipe, carried out above the roof. A bent pipe, pierced with a number of holes, encircles the top of the bowl, communicating with another ventilation pipe, carried separately to the roof.

In addition to this, all the traps are provided with air-pipes, which extend to the top of the house. Of course, some of them join in the ascent, but they are carefully sorted, so that the evil communications of those from the fouler places may not corrupt the good manners of the more harmless ones. Thus, the vent-pipes from the closet traps on each side of the house are joined in one, but kept separate from any others. Another shaft is devoted exclusively to the ventilation of the closet bowls, and the receivers have also one to themselves. The slop-sink traps have a separate pipe as far as the upper story, where it joins that from the closet traps, while the air-pipes from baths and wash-bowls are joined and carried up in one. All these are duplicated, one set being required on each side of the house, and with the open mouths of the two soil-pipes, and that which supplies air to the foot of the drain, we have thus eleven shafts projecting above the roof. This may seem an unreasonable number to an engineer, but our practical plumber by paying for them has borne witness to his sense of the necessity for them.

One other point may be mentioned to complete the description of this particular example of plumbing work. The house, like all others of its class in Boston, is supplied through the intervention of a tank in the attic, and in order to be able, at pleasure, to shut off the water from any part of the house, four separate pipes issue from the bottom of the tank, ramifying as they descend through the house into the smaller branches which supply the different apparatus. The usual mode of controlling the flow through these pipes is by a stop-cock close to the tank, but they are seldom used, and the ordinary ground faucets slowly corrode and become immovable. The compression cocks are better, but the course of the water through them, even when wide open, is very tortuous, and the supply at points below is less free on that account. In this case our plumber has solved the difficulty by putting on steam valves, of the kind known as the straight-way stop-valves, in which a solid gate of brass moves by the action of a screw directly across the bore of the pipe, and when opened leaves the water-way entirely free.

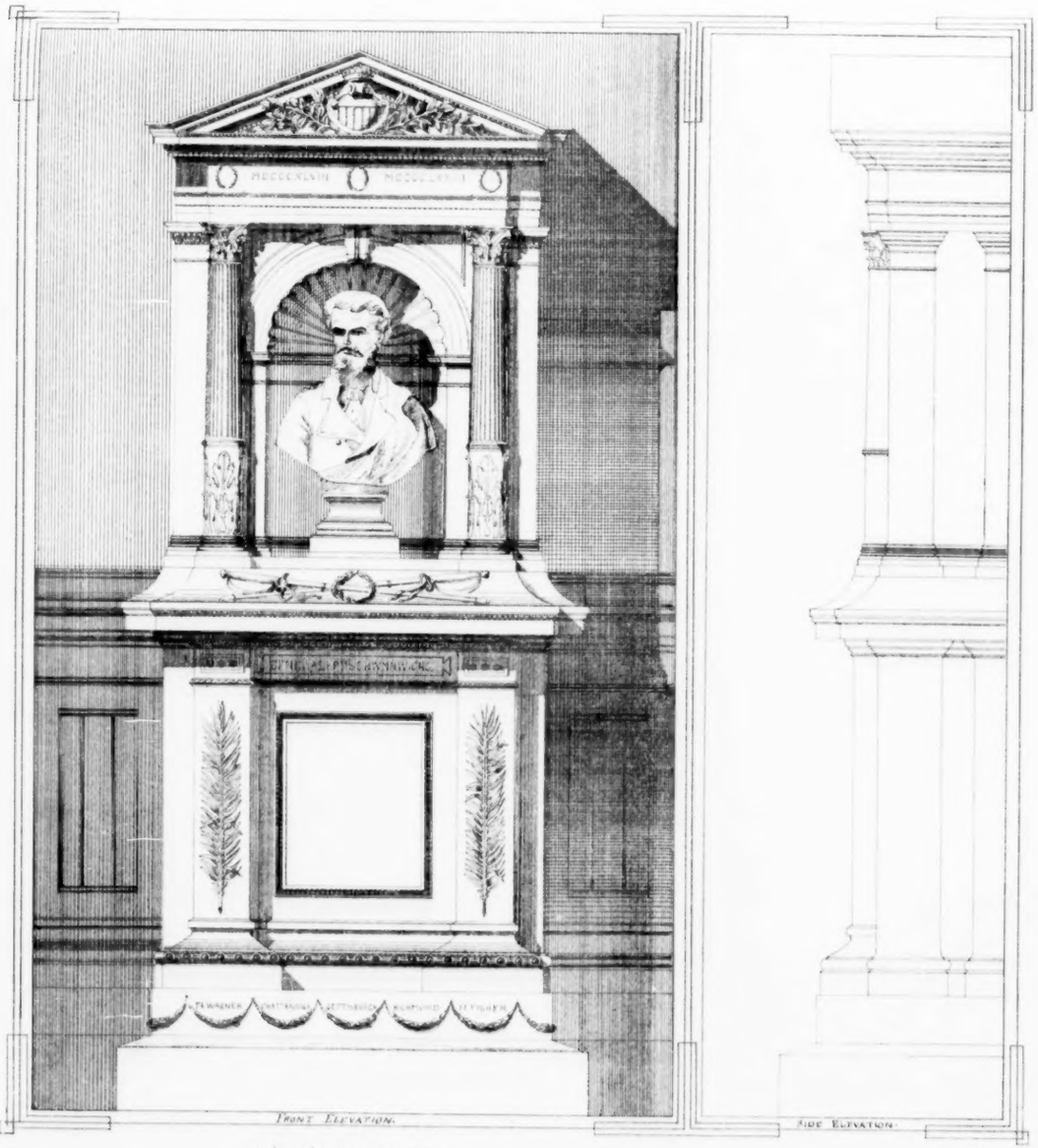
This is the kind of work which a first-rate Boston plumber, acting without any specification or directions from the architect, taking the job as sub-contractor under the builder, who troubles himself about the matter only so far as to require that the bids should be understood to be for good workmanship, thinks himself bound to put into the building. At half the cost, he could have completed his contract in a manner which would have passed inspection as good ordinary work, so that he has followed out his convictions of what was needful to a perfect job at his own expense. We have heard a good deal lately about the bad plumbers and their misdeeds; let us not forget to give the good ones, where we find them, such credit and encouragement as we may.

## LATHAM'S SANITARY ENGINEERING. SECOND EDITION.[1]

This second edition is better and worse than the original. The decided merits which made that acceptable and welcome to all engineers of sewerage works are retained and amplified, and the marked defects which were conspicuous there are emphasized here. One can only admire the thoroughness and the good judgment with which the handbook parts of this treatise have been put together. But for all that, the book as a whole is disheartening; if an intelligent man, who has devoted his life to this subject, and who has driven his pen into its remotest corners, could fail to comprehend some of its simplest theoretical elements, what hope can we have that the general public, whose enlightenment is essential to sanitary reform, will ever learn what it needs to know?

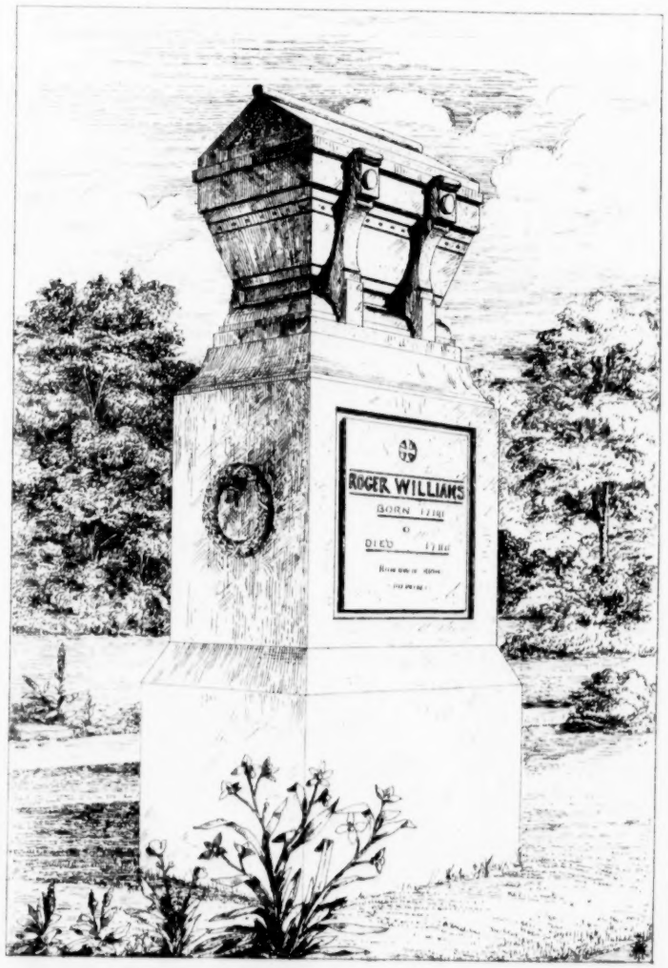
So far as we have examined the literature of the subject, the book is indispensable to the professional class for whom it was written. It really omits very little of the essential data concerning sewerage. The tables, the formulæ, and the illustrations of details of work are very complete, and they are conveniently and judiciously arranged. The general considerations which affect the arrangement of plans of sewerage are comprehensibly set forth, and all that the author has learned in his studies and in his practice is faithfully recorded. The result is not precisely a *vade-mecum* for the engineer, for Mr. Latham sometimes leads where it would not be judicious to follow. But he has gathered together pretty nearly all that

[1] *Sanitary Engineering.* A Guide to the Construction of Sewerage and House Drainage, with Tables for facilitating the Calculations of the Engineer. By Baldwin Latham, C. E., M. Inst. C. E., F. G. S., F. M. S., Past President of the Society of Engineers, etc. Second Edition. London and New York: E. and F. N. Spon. 1878.




MONUMENT FOR A SOLDIER

EDGAR C. CURTIS - ARCHT
24 COURTESY ST. Boston.




MONUMENT TO ROGER WILLIAMS
ERECTED FOR THE CITY OF PROVIDENCE
BY THE DIAMOND HILL GRANITE COMPANY.
FRANK M. HOWE, ARCHT., BOSTON.

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON

DINING ROOM IN THE HOUSE OF G B CHASE ESQ. BOSTON
WARE & VAN BRUNT, ARCHTS

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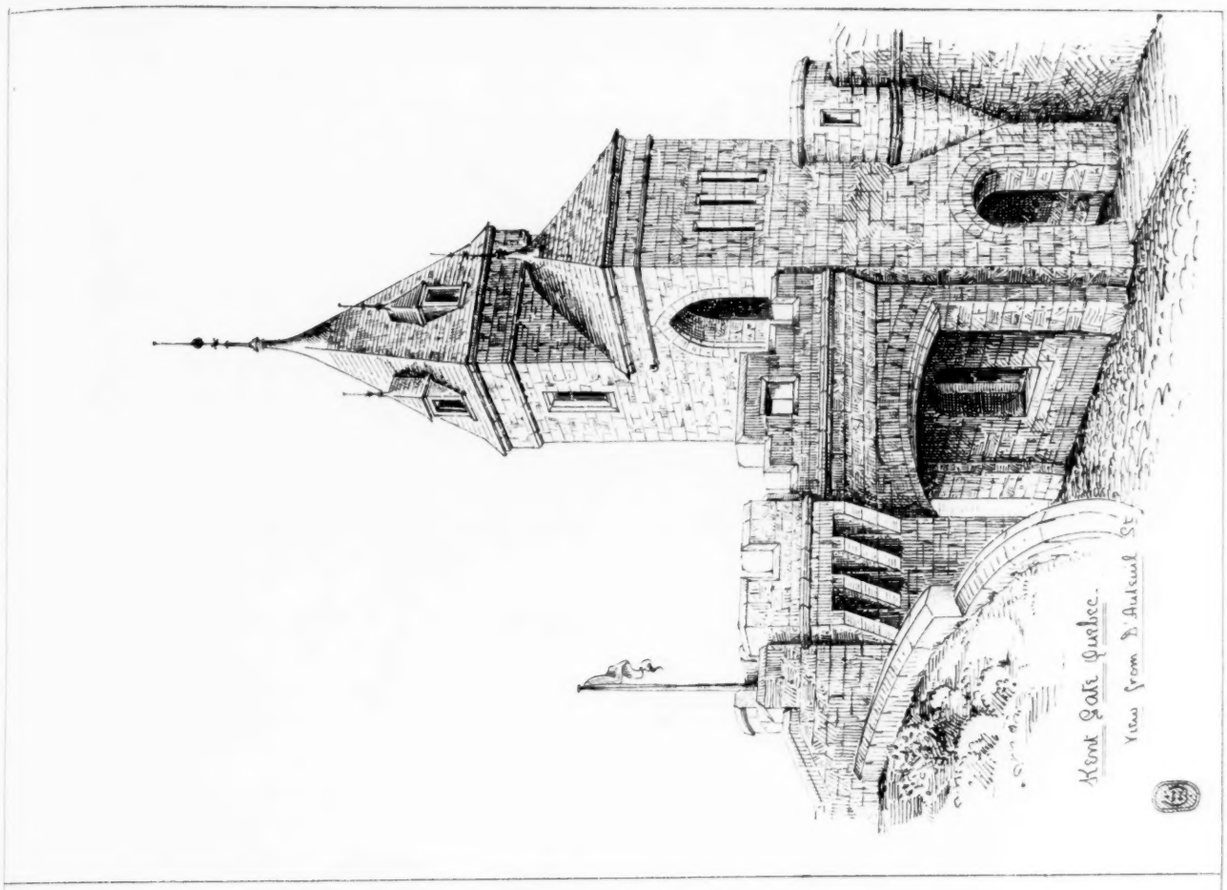


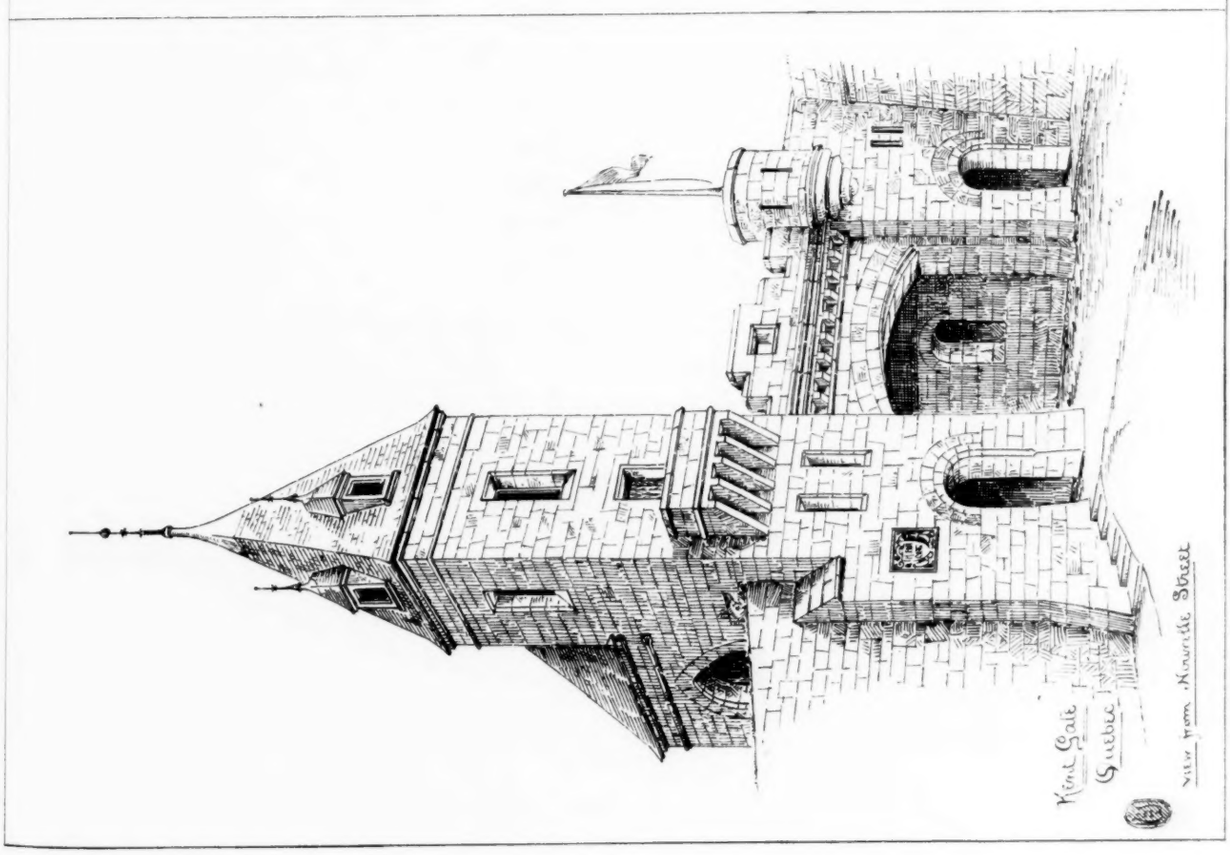


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FIRST STORY PLAN

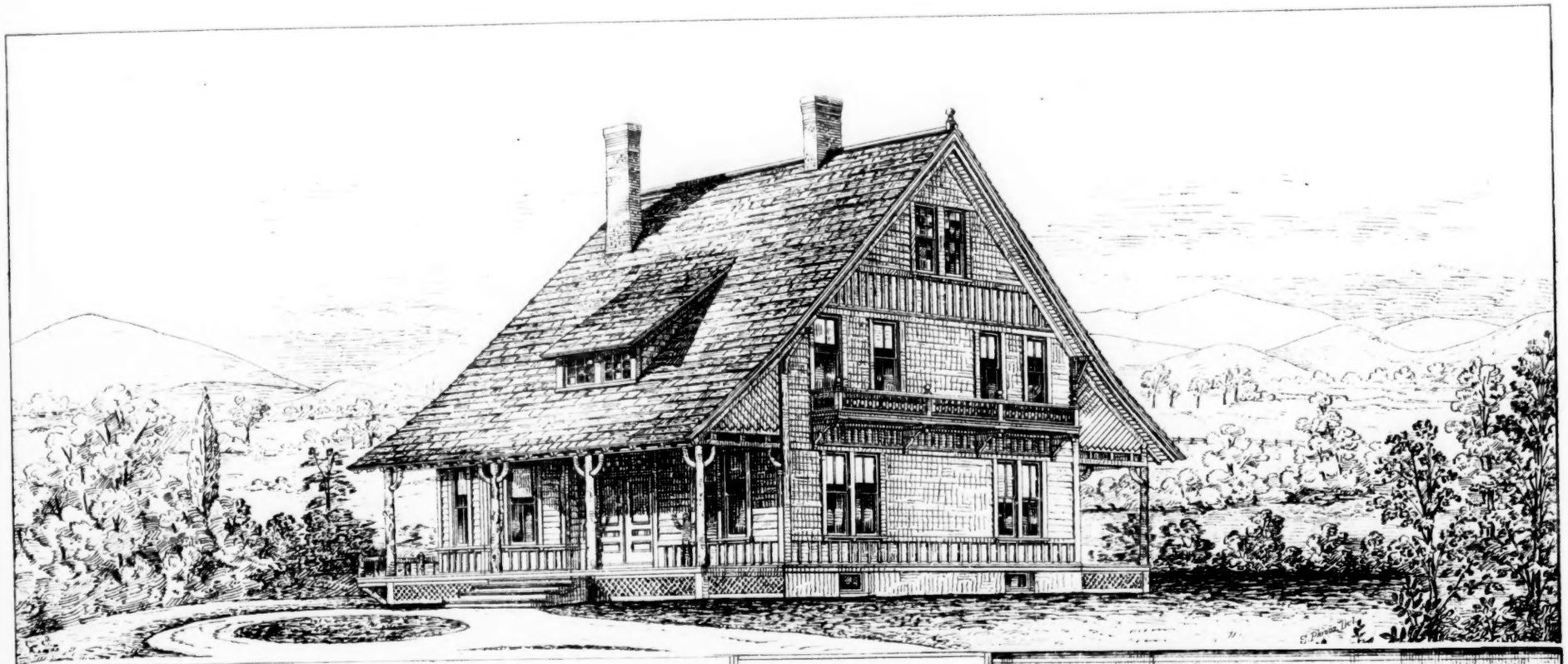


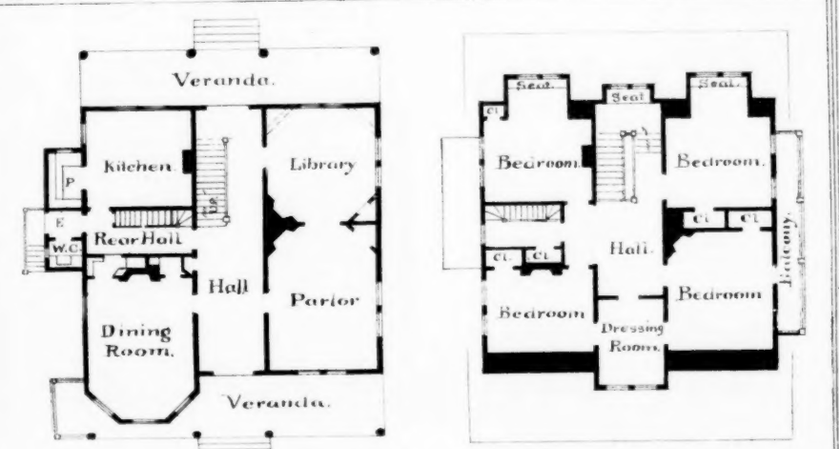
SECOND STORY PLAN



ELEVATION OF OCTAGON END OF PARLOR

THE HOLLISTON PRINTING CO. 220 DEVONSHIRE ST. BOSTON



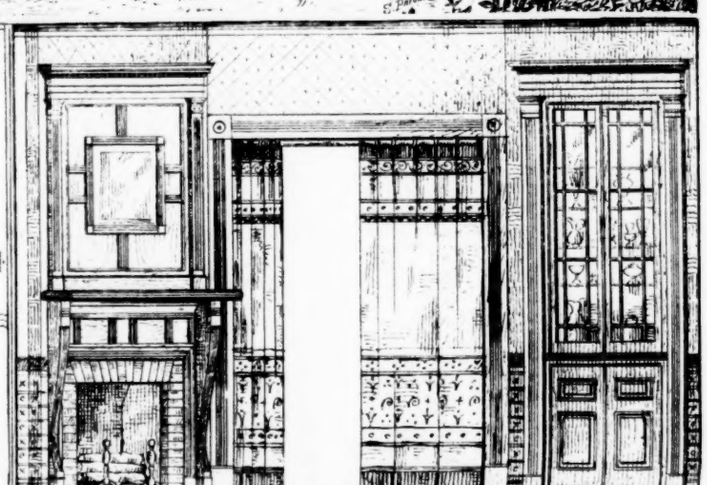






Cottage
Built in
North Conway
for
James Schouler Esq.
of Boston.

Stephen C. Earle.
Architect.
9 Pemberton Square
Boston.



FIRST STORY PLAN — SECOND STORY PLAN — ELEVATION OF OCTAGON END OF PARLOR

The Heliotype Printing Co. 330 Dearborn St. Boston

a multitude of other books would give us, and has classified it under its appropriate headings. The novice should be wary in reading him; the readers of judgment and experience will have frequent occasion to thank him for having so thoroughly winnowed his professional library for their benefit.

That which will be found most directly useful is the series of tables, — over thirty in number, — giving the proper inclinations for given velocities; the different velocities for different inclinations; and the amount of discharge at various rates of inclination, for round sewers and for oval sewers of different forms, the sizes running from three inches to six feet in diameter for round sewers, and from one foot by one foot six inches to six by nine feet for oval sewers. The formulæ on which these tables are based are duly set forth and discussed, and the application of the tables in practice under different conditions is sufficiently explained. The practical execution of work under different circumstances as to ground, climate, material, and workmanship is treated, not perhaps so as to make an engineer of a common contractor, but so as to help an engineer of native shrewdness and ingenuity, in a very effective way. The practical work with which Mr. Latham has been connected is quite fully described, and its details are offered as examples. Many of these, as the construction of the sea outlet at Llandudno, will be found especially valuable here, where experience in the modern refinements of sewerage are only beginning to claim attention. The text is copiously illustrated with good wood-cuts, showing details of work, and there are twenty-three folded plates, filled with a great variety of appliances of all sorts, giving constructions of rain-water intercepters, the sewerage works of Dantzic, sections of sewers, artificial foundations, flushing gates and valves, flushing tanks, man-holes, side-entrances, gullies, traps, outfall works, tide and rain-water valves, penstocks, inverted siphons, cleansing tools, house-drainage, water-closets, and urinals, — the whole affording material for a very good general survey of the condition of the subject up to a recent time. It is to be regretted that the same thoroughness of description and illustration were not applied to the elucidation of the different methods for disposing of sewage in settling-tanks and by agricultural irrigation. Let us hope that Mr. Latham has only reserved this subject for future treatment.

While giving this hearty commendation to the work under examination, as a handbook for practice, we cannot withhold an equally cordial adverse criticism on other points. In the first place, and, if we are correctly informed, most important, is the relation in which Mr. Latham places himself to the construction of the sewerage works of Dantzic, for which he assumes full credit. On the plate which gives the general plan of the Dantzic Sanitary Works, except the sewage farm, we see, "E. Wiebe, C. E., and Baldwin Latham, C. E., Engineers for Sewerage Works." On page 479, we are told that "Mr. Wiebe and the author introduced a plan of sub-soil drainage, etc." So far as we have been able to discover, this is the only recognition which Mr. Wiebe, one of the first sanitary engineers of Germany, and emphatically the engineer of the Dantzic system, as it is so copiously illustrated in this book, receives at the hands of his assistant. It would have been no detriment to Mr. Latham's reputation if he had frankly stated the facts as they were, that is, if he had given us the simple fact that such a man as Wiebe had, when seeking in England for an engineer capable of arranging the details of his sewage farm, selected him, from among so many competent men, for this responsible service. It is of detriment to his reputation that he has treated this subject as he has done.

It is in treating of the sanitary aspects of his subject that Mr. Latham shows his greatest limitations, — largely by his habit of writing first on one side and then on the other, with no apparent recognition of the weight of either argument. On page 311, he quotes Dr. Carpenter, of Croydon, as saying "that all contagia are neither ethereal nor gaseous; that they are in themselves particulate and non-volatile." He adds: "If this is so, it must be difficult for the poison of enteric fever to become largely disseminated in the air of sewers." On page 321 he shows clearly, and proves by Dr. Frankland's experiments, that, in the bursting "on the surface of a liquid of bubbles due to the escape of gases generated during the process of putrefaction," aqueous matters are thrown into the air. The influence of watery vapor, which is constant in the air of a sewer, in carrying the impurities of the sewage, he seems to disregard. It would be easy to prove from his pages that perfect ventilation of sewers is dangerous, and to gather the inference that sewers which discharge their sewage before decomposition can arise are, so far as typhoid fever is concerned, as injurious as sewers of deposit. He accepts the germ theory of disease without question. Page 5: "Every disease has it own type, its own specific germ of generation. Every germ of disease requires conditions suitable for its development." Pages 324–5, speaking of the fetid organic vapor in sewer air, he says: "Of its exact nature and composition but little is known; either it is itself the cause of disease or it carries the germs of disease, which are supposed to float about in the air of sewers like the fine pollen of flowers floats about in the atmosphere. This vapor, or the germs of disease, can alike be effectually absorbed and destroyed by the use of charcoal." On page 312, he argues that as the lesion of enteric fever affects only a short length of the lower intestines, "the simple breathing of the poison would not carry it to the necessary seat of the disease." The medical authorities quoted to support this inference show why the breathing of air infected by typhoid-fever dejections *so often* fails to communicate the disease, — by no means do they attempt to prove that it may not be communicated in this way. In speaking of the sewers of Croydon as being free from decomposition, he makes no account of the decomposition of the slime adhering to their walls, though in other cases he attaches importance to this fact. He treats as a matter of consequence the fact that barometric changes alter the capacity of air to penetrate water, and the fact that water holding a certain amount of air during a high barometer must give out air during a low barometer, the air thus given out being foul (page 333). On page 371, he says that air carried into sewage by falling water "may be fouled in its passage through the sewage, so that when it escapes from the sewage, it may become a source of impurity in the air of the sewer." On page 425, he overturns this theory by the following remarkable statement: "One thing is certain with reference to malaria (*sic*), that all authorities are agreed that it is never extricated from a water surface. It is only after a swamp has become dry that malaria makes its appearance and commits its ravages. If we admit with Dr. Fergus that sewer air may be passed through the water of a trap, we may be assured, on the other hand, that anything injurious held in the sewer air would be washed out and held harmless in the water of the trap; for, however offensive and however overloaded water may become, so long as water remains, all experience goes to prove that no evil consequences follow." This was published, be it understood, in the last quarter of the nineteenth century, by one who assumes to be a sanitary authority. If true, it would solve the problem of privy vaults and cesspools, which need only be made tight and their contents kept liquid, to secure absolute safety.

On the technical part of the question of house-drainage, he shows much less knowledge and experience than concerning sewerage. He is here by no means a trustworthy guide. For example, on page 485, he says, "Lead is one of the best materials which can be used for soil-pipes." On the next page he recommends the use of vitrified pipes, built into the walls of new houses, as safe soil-pipes, which might be true if walls never settled. Concerning the ventilation of house-drains, he dismisses the applicability of "mine" ventilation, — which is exactly applicable here, because it is not applicable to a ramifying system of sewers.

## THE ILLUSTRATIONS.

DINING-ROOM IN HOUSE OF GEORGE B. CHASE, ESQ., BOSTON, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS, BOSTON.

THE decorations of this room have been contrived mainly with a view to increasing its apparent size, by opening the bay-window more completely into it, and by such a treatment of the ceiling as to encourage the idea of the extension of the area of the room into this bay. The beams of the ceiling are in butternut wood, enclosing pierced panels, which show the *fond* of the ceiling behind. This arrangement serves as a border carried around three sides of the room, and stopping against the bay end, where the beams are received by pilasters and trusses, enclosing painted panels, which serve as the most important decorative features of the apartment, and furnish its key of color. The central division of the ceiling is decorated with grape-vines in dead greens and blues, and divided by ribs of butternut. The frieze is in green, blue, and black, very dark, and the wall-screen below in light olive. The curtains are in dark olive greens and gold. The room receives southern and western light.

KENT GATE, QUEBEC, CANADA. MR. W. H. LYNN, R. H. A., ARCHITECT.

This gate is one of several which are to be built in the walls of the city, as explained in the description of the Quebec Improvements in the *American Architect* for April 14, 1877, the walls themselves being converted into a promenade around the city. The work is now being carried out by Mr. Thomas F. Scott, chief architect of the Department of Public Works.

COTTAGE AT NORTH CONWAY, N. H., FOR JAMES SCHOULER, ESQ., OF BOSTON. MR. STEPHEN C. EARLE, ARCHITECT, BOSTON.

This cottage, built during the past season, is situated near the Intervale House and commands a charming prospect of the Saco, the meadows, and the mountains. It is designed as a quiet summer residence and has been treated very simply, inside as well as outside. The finish being white pine without paint and the floors plain hard pine. A. Turber, of North Conway, was the contractor. The cost was about $5,000.

DESIGN FOR A SOLDIER'S MONUMENT. MR. E. C. CURTIS, ARCHITECT, BOSTON.

MONUMENT TO ROGER WILLIAMS, PROVIDENCE, R. I. MR. F. M. HOWE, ARCHITECT, BOSTON.

This monument is to be placed by the city of Providence in the burial-ground of the Roger Williams Park in that city. It is the accepted design of those offered in an open competition held last December.

## THE LATE R. G. HATFIELD.

BOTH the profession and the public in New York lose in Mr. Hatfield one of the most valuable members of the profession, — a loss that in many respects cannot be made good for a long time.

His superior knowledge of all that appertained to construction, the general breadth and wisdom of his views upon all subjects in

which he interested himself, his extremely systematic and business-like habits, and his conscientious and upright character caused him to be one whose name added strength and confidence to any matter before the public. On this account his advice and counsel were continually sought in public matters connected with his profession. His last labor was the careful examination and analysis of the multitude of plans presented in the "model tenement-house" competition. I met him at the hall, a few days before his death, and could but greatly admire the patience with which he examined and thoroughly analyzed each scheme. A few that seemed upon a casual glance entirely devoid of merit, and called forth a jesting remark, drew from him the reply that they had some good features, which he proceeded to point out, showing that nothing had escaped his careful examination.

Mr. Hatfield was widely consulted by members of the profession in regard to difficult problems that came before them, and always with satisfactory result. The great iron roof of the Grand Central Depot was planned by him, as well as the roofs of several of the largest churches in the city, where the support was obtained from longitudinal trusses of unusual length. When not engaged in business he amused himself with experiments testing the strength and qualities of materials, and from time to time gave interesting statements of results reached.

His professional work was not highly artistic in character (his reputation did not rest upon this), but it was oftentimes very ingeniously planned, and always well executed.

The crowning work of his life, however, has been his treatise on Transverse Strains, which has met with high commendation from every quarter, especially from English engineers and architects. The extremely complimentary notice of this work by a prominent English engineering journal, not long since, must have been not only very gratifying to Mr. Hatfield, but to the profession in our country generally, who were honored in the honor of their fellow member.

For many years he has held the arduous and thankless office of treasurer of the Institute of Architects, managing its affairs with great care and wisdom. A view of his accounts not long since revealed an unexpected amount of labor and attention, and led to an appreciative expression of his goodness in having so long and admirably carried on this work. He, however, made light of it, saying that system and the trained assistance he had in his office prevented it being burdensome. He seemed to like to do those things that were in danger of being neglected, — things that were not interesting or pleasant, and so were likely to be avoided by others.

His loss will also fall very heavily upon the New York Chapter. He was a president who had the respect and good will of the entire profession. Petty jealousies and pique never seemed to connect themselves with him, but his name added strength and dignity to the Chapter. He was rarely absent from the Chapter meetings, and often contributed greatly to their interest. Those who have met him frequently during the past year have noticed a certain mellowing of character, an increase of kindly, genial feeling, that has made him a most agreeable companion, and will render his memory especially pleasant.

The funeral at his home in Brooklyn was attended by delegations representing the Board of Trustees of the A. I. A., the New York Chapter, and the profession generally. A former pastor of Mr. Hatfield's, who took charge of the service, based his remarks upon what he considered his strongest characteristic, "love of truth," and showed very forcibly how this had influenced his whole life. It had, he said, made him in the church a most valuable member, a pillar of strength. By truth the speaker said he meant not mere veracity, but something much broader and deeper, that delighted to ascertain the right, to go to the bottom of things to find it, and that saw through and stripped off all disguises. Returning with him one Sunday evening from a brilliant discourse, he asked Mr. Hatfield how he liked it. "It was fine as a rhetorical effort, but the conclusions could not be logically drawn from the premises laid down." Then he proceeded to show the mistakes and fallacies of the argument. This love of truth the speaker thought interested him in the chosen specialty in his profession, and was the guiding impulse of his life. C.

## CORRESPONDENCE.

### CHURCH ALTERATIONS. — THE STATE HOUSE. — A NEW CITY HALL.

Hartford, Conn.

An important work to be undertaken in this city during the approaching spring from designs by Mr. Withers, of New York, will be the alteration of the chancel end of one of our oldest Episcopal churches, — Christ Church, — together with the building of a chapel in the rear of the church. The edifice, an example of Perpendicular Gothic, was built by Mr. A. J. Davis, of New York, under the direction of Dr. Wheaton, the rector, a gentleman of strong architectural proclivities. The alteration will provide a recessed chancel with a rich stained-glass window of foreign manufacture in place of the present one. The chapel will replace the rather primitive structure which now occupies the site, and will be connected directly with the church. Besides affording ample room for the Sunday-school, accommodations will also be provided for meetings of the church missionary society and for other parish organizations. The entire work will be a gift to Christ Church from the widow of the late Major James Goodwin, of this city.

The recent criticism on the new capitol in Hartford, by Mr. Clarence Cook, has been received with diverse comments. While in some cases he has passed severe strictures upon the work, in others he has, it must be confessed, hit the architectural nail firmly on the head. The just dealing and fair action of the commissioners are to be commended, and yet it is to be regretted that the same spirit manifested in a portion of their complex duties was not carried out to the end. It remains in the minds of inquiring persons a conundrum unsolved, why the state comptroller should necessarily add to the list of his controlling duties the control of the finishing of the various rooms, while the matter of decoration was intrusted to the hands of a professional. Naturally, the result has been a clashing of ideas and a want of harmony. The economical action in regard to the statuary, referred to in a former letter, by which the figures are to be duplicated, received at the hands of the *Tribune* critics merited censure, while the sentiments with reference to the surmounting figure in bronze are echoed daily by the many people who lift their eyes to the crowning "Genius." Apropos of this work of art, the latest plan regarding it is to make a change in the position of the arms. An alteration of the model has been made in Rome by Mr. Rogers, the sculptor, and photographs of the altered statue have recently been received by the chairman of the commissioners, which show the right arm of the figure elevated above the head, the hand holding aloft the wreath of immortelles. The position is unquestionably an improvement upon the former, and adds a grace to the figure which to critical eyes is wanting as the figure is now exhibited to the public.

The success of the representatives' hall considered with relation to its acoustic properties is a mooted question. It has been suggested that the floor of the hall should be raised so as to bring it on a level with the first floor instead of with the mezzanine floor as at present. Should this plan be carried into effect, the main entrance vestibule to the building on the south will be treated with a vaulted ceiling corresponding to that in the north vestibule. Experiments have, by order of the legislature, been made in the representatives' hall, to better the so-called defects in the acoustics. The processes and results are of deep interest. Upon the removal of a curtain suspended over the hall at a few feet from the ceiling, and which it was said improved the hearing, it was found that the voices of the members could be heard as well as when the ceiling proper was hidden from view! At this writing a second experiment is being made with wires stretched across the ceiling, and it would not be a matter of great surprise if after all schemes had been tried the whole subject was let alone, and by the close of the session it was discovered that when the speakers had become accustomed to the hall, their voices could be heard without much difficulty, while the hue and cry about the sad failure of the capabilities of the elaborate hall was a rather large-sized tempest in the legislative tea-pot.

State House Square, on Main Street, the original site of the old public building, and its vicinity, will probably undergo material changes during the coming season. A new five-story block is to be built upon State Street, nearly opposite the periodically progressing granite post office. The block is from the designs and plans of Mr. S. W. Lincoln, a local architect. It will be built of brick, with a finish of Ohio sandstone. The front is divided by a central projection into two bays, and is thirty-six feet wide. The ground floor will contain two stores. The building will be begun at an early date, and will cost about $12,000.

A valuable site on the same street, flanked on either side by brownstone front banking houses, has been purchased by the Hartford *Daily Courant*. It is rumored that a substantial block will be built by the association at no distant day, intended in part for the *Courant* office and in part for other business and professional offices.

The growing needs of the city, as well as the recent abandonment of the old State House, have given rise to a question of some moment to the profession, namely, the possible, if not probable, erection of a public building for the accommodation of the various city offices. As is customary, there is a certain amount of opposition to the project, on the ground of unnecessary expenditure. The economists have already secured plans for the alteration of the old building, at an expense of some $7,000; but by this arrangement complete accommodation could not be furnished, and on this ground, as well as for other cogent reasons, it is deemed prudent by a second party to build a city hall which shall in every way satisfy present and prospective wants. The question is further complicated by a division of opinion regarding the feasibility of building in connection with the city hall a structure intended for county purposes, the expense of the entire work being borne equally by city and county. A county building is a desideratum, and if it is not built in this way will, without doubt, occupy a lot in another part of the city. Among the sites mentioned is a position near Bushnell Park, and within a short distance of the capitol.

Turning aside from this warm discussion, it is refreshing to chronicle the erection of ice-vaults, built from plans by Charles Stole, architect, of New York. The front is built of common brick, laid in red mortar; the finish is of Canaan marble. The building is four stories in height, and midway upon the front is a projecting corbel of marble supporting a large and somewhat pretentious statue of Gambrinus.

Among the private dwellings in process of erection in the city is a brick and stone house for Judge White, from plans by Mr. J. C. Mead. A pleasing variety in the use of material is given by the in-

troduction of excellent moulded brick. The diaper brick used in the principal bands are of New Haven manufacture, and are worthy of extended use by reason of their fine quality as well as for the excellence of the patterns. CHETWOOD.

### AN EXHIBITION OF WALL-PAPERS.

CHICAGO, February 20, 1879.

LAST Thursday evening an entertainment of a novel and interesting character was given to a few invited guests at the rooms of John J. McGrath, in this city. It was the first of a series to be continued through the winter and spring, the remainder of which will doubtless be thrown open to the public. The object of the exhibition was to show the progress made in the designing of wall-papers of late years, compositions and arrangements of papers for decorative purposes, and combinations of printed wall-papers with painting by hand. The last of these is a process of recent introduction. Paintings are executed on plain wall-papers after hanging, or on diapered patterns in color or gold used as backgrounds, or printed designs are varied by handwork to harmonize with surrounding details, either by painting out or filling in. Sometimes two printed patterns are blended into one, as was shown on a folding screen. Common canvas printed in bold chintz patterns is toned down by glazes of oil color and used as a background for figure painting. A French example of this was exhibited. Wall-papers with gold grounds are painted with oil colors, those with colored grounds in distemper, or the same colors as are used by the print work.

A large number of papers and samples were exhibited which had been collected by Mr. Joseph Twyman during a recent visit to France and England. Among these was Walter Crane's new peacock frieze, designed for Jeffrey, especially to be exhibited at the late Paris Exposition, just as his Marguerite paper was issued by the same house for the Centennial Exhibition, — though seen then by few, for it was hidden away in a lofty gallery. The frieze paper of this last-mentioned set, commonly known as the Alcestis frieze, — as it portrays Queen Alcestis and the womanly virtues which she possessed, as described in Chaucer's "Legende of Gode Women," — was exhibited in a frame. It contains, besides the queen, her guardian angel and four female figures typical of her virtues. The peacock frieze is made in heavy, embossed paper intended to imitate leather; several shades of bronze are used on it besides colors. The peacocks, with outspread tail feathers, stand, I may say, in front elevation. Between them are represented, as described by Mr. Crane, the winged genii of time, with sickles in outstretched hands, mounted on harvest cars. The full set of papers,[1] of which this frieze is only a part, received a gold medal at the Paris Exposition. Another frame contained a frieze pattern by J. Moyr Smith, representing the seasons by figures of men ploughing, sowing, reaping, and threshing. Another frieze from De Fossée, of Paris, was exhibited. It is twenty-four inches wide and represents the Triumph of Ceres. The pattern is thirteen and one half feet long without repetition, and it required one hundred and thirty-two engraved blocks to produce it. This is probably the most costly piece of hand printing ever attempted. A frieze by Le Cerf of Paris was sixty-two feet long and twenty-eight inches wide. It was mounted on canvas and hung on one of the side walls in a heavy black frame. It contained twelve different figures on gold grounds, being flat, conventional drawings of men in various occupations of life. Each figure was divided from the next by a diaper pattern on gold ground. The whole was enclosed with horizontal and vertical borders of Gothic pattern. This is the only set of the frieze that has been brought to America.

Mr. McGrath exhibited a number of his own private patterns, many of them specially designed for him. He is one of the few dealers who have employed American artists to make special designs for wall-papers.

The outer walls of the entire room were draped from cornice to floor with about three hundred patterns of paper, representing the different periods of decoration from the thirteenth century to the present time.

English designers were represented by J. Moyr Smith, B. J. Talbert, Dr. Dresser, Walter Crane, William Morris, Wilberforce, R. Bennett, Milford Warner, Henri, and the late E. W. Pugin and Owen Jones; Americans, by Deisner, R. Sturgis, Wight, and Twyman; while French manufacturers were represented by Ballin, Hoch Frères, Gillow et Fils, Bézault et Patti, and De Fossée of Paris; English manufacturers were represented by Jeffrey, Carlisle & Clegg, Scott, Cuthbertson & Co., and Tolman of London, Trumbull & Sons of Leeds, Potter of Darwin, Lancaster, and Wylie & Lochead of Glasgow. The leading American houses of Philadelphia, New York, and Brooklyn were also represented.

There were some examples of papers, dadoes, and friezes called in England the "Adam style" of decoration; very Italian in feeling, with just a touch of the English pervading both coloring and design. The style gets its name from the brothers Robert and James Adam, celebrated architects of the eighteenth century. It will be remembered that some mention of the works of these men was made in the papers on "Decorative Fine Art Work" at the Philadelphia Exhibition of 1876,[2] Messrs. Wright & Mansfield, of London, having exhibited some panelled decoration in that style, which is just now the fashion in London. The only examples of it which have been produced were brought over by Mr. Twyman.

The leading feature of the exhibition was a series of screens hinged together, three in a set, and representing the sides of a room. Four suggestions of rooms were thus presented with two sets of screens, they being covered on both sides. The first showed a drawing-room treated with combinations of papers, American and English, and had painting on paper grounds. The main wall-paper of this room consisted of a well-drawn holly in gold and color on a background representing mistletoe on a black ground. This was separated by an ebonized picture rod from a very broad frieze consisting of a black ground with branches of mistletoe and holly painted in oil colors from designs of Mr. Twyman. The frieze was broken up at distances of about four feet by panels having in them the figures taken from Walter Crane's Alcestis frieze on dull red ground. A panel representing the space over a mantel-piece contained a painting in oil colors on figured canvas representing a *grande dame* of France in early eighteenth-century costume; surrounding the painting was a border of heavy Utrecht velvet paper, with ebonized mouldings between it and the picture. A dado paper, separated from the main wall-paper by an ebonized chair moulding, was in myrtle greens and gold, of English make. Above the mantel panel was a black panel, with ebonized shelf between, the background being left plain to afford relief to plaques or pottery. Gilt sconces were placed on each side of the mantel panel. The apartment had a dull maroon India rug on the floor, and contained a few ebonized chairs and a spinning-wheel. The second apartment represented decoration suitable for a dining-room. A wall-paper eight feet high from the base moulding contained straggling branches of orange-tree in six different colors of flocks on a greenish metal ground. Above it was a twenty-inch band of maroon velvet paper hung with Delft plates and some hand-painted ones by American women. The frieze above this was thirty inches wide, with gold ground, having painted on it a bold growth of lilies springing up at irregular heights. A door was represented, and over it a shelf containing some blue Flemish stoneware. The side casings of the door ran up to the ceiling. The first panel over the door was plain maroon velvet. The second panel in line with the frieze consisted of a branch and bird painted in oil, with Japanese contempt for symmetry, upon a gold paper ground. This was designed by Mr. Twyman. The third room represented was suitable for a library. The lower paper was of Japanese character, with vines on gold ground. It was eight feet six inches high, and intended to form a proper background for bookcases. Above this was a thirty-inch band of gold mosaic pattern, forming an excellent background for some busts which were placed against it on brackets. Above it was an eighteen-inch frieze of the same tones of color as the main paper. The fourth apartment suggested a reception room in the Henri IV. style. It was entirely decorated with imported French papers, having panel treatment throughout. But the panellings were formed by interlacing flat bands of ebonized wood, which removed all suggestion of constructive work, bringing out the full decorative or pictorial effect of the very rich papers employed. The styles were embossed Utrecht velvet, very wide; the mouldings around the main panels were in double rows, with inlays between of eighteenth-century design; the panels were of French tapestry paper, in dull browns and reds with gold thread on deep russet ground. Draped across one end of the room was a piece of Henri IV. tapestry. The floor had an old Persian rug. Paintings hung on walls had gold frames. The furniture was ebonized, with rich tapestry coverings. All the papers in this room were made by Bézault, of Paris.

With such an exhibition as this before us it needs but little reflection to realize what an immense advance has taken place in the designing and manufacture of wall-papers within the last five years. It is not long since a few enthusiastic architects would clutch to their bosoms any samples of artistic papers that might come into their hands, and hoard them up as precious things. To be able now to go into a store and select from three or four hundred patterns, all designed by the first artists of England, France, and America, must be regarded by every lover of the beautiful with genuine satisfaction. But to visit a private exhibition of three hundred wall-papers and not see a single pattern which is bad in design may be safely said to be one of those things we have scarcely dreamed of. W.

[1] The *Building News* for February 21, 1879, contains an illustration of this set of papers, which formed part of Messrs. Jeffrey & Co.'s exhibit.

[2] *American Architect*, vol. ii., p. 3.

## COMPETITION IN INTERIOR DECORATION.

### COMPETITION NO. II. — A SIDEBOARD.

THE subject of the second competition will be a sideboard in the dining-room of a retired manufacturer whose former employees have presented it to him with a view to its displaying a full silver dinner-service (which is not necessarily to be indicated), also presented by them. It is placed between two windows and opposite the fireplace, and its ornamentation, which is to be properly subordinated to its general design, is to indicate the manufacture in which the gentleman acquired his property. The extreme length of the sideboard is not to exceed nine feet, and its height must be less than the height of the room, which is fourteen feet.

*Required:* An elevation, a section, and details to a larger scale.

Drawings must be received at the office of the *American Architect* on or before April 5.

## ARCHITECTURAL STUDY.

To the Editor of the American Architect:

*Sir*, — I have just read an article in your journal of February 22, entitled "Young Architects."

I have wished for some time to see such an article published by an able architect, as I take the writer to be, that I might reply to it through your columns, asking that the same architect, or some other, might, in an article as clearly and well written, tell young architects how to stock their minds with the information that will enable them to show in their work that valued homogeneity to which he refers, and the absence of which he so deplores in most of our architects.

There are many young men ambitious to become architects who are not able to attend the architectural schools for the limited term of two years, nor even for one, myself among the number, but who have to work alone and teach themselves.

Will the writer of the article in question try to assist this class of young architects to make of themselves something besides mere copyists; will he, instead of dealing in glowing generalities, prescribe a course of study, naming the books that will be the best text-books, the order in which they should come, etc.?

Those who live outside an architectural atmosphere are at a loss how to select books. They send for catalogues, select books, and when they receive them find them comparatively useless. The writer of "Young Architects" can confer a favor on a large class similarly situated to myself, and do some good in the cause of architecture by descending to details in his information.

Take for granted that a man has a fair mathematical education, is a fair draughtsman, — then give him a list of text-books that will put him on the road to make himself an architect, not merely in name but in truth.

Young Architect.

## NOTES OF EXPERIENCE AND INEXPERIENCE.

3. Furnace Hot-Air Pipes. — "Hot Air" may be able to get a freer current by raising the end of the pipe leading to his northwest room, so as to get the ascent as steep, and the flow consequently as rapid, as possible. If the cellar is too low to do this, a conical top to the furnace helps to throw out the warm air in all directions. The Archimedean-screw ventilator would be worse than useless. It is very difficult to get furnace heat into exposed rooms on the ground floor, unless the furnace is placed, as it should be, considerably away from the centre of the building, toward the cold side, so that the air can ascend to those rooms nearly vertically. With second-story rooms the greater vertical height of the pipe, like lengthening the leg of a siphon, helps the upward current, and perhaps "Hot Air" might, if not inconvenient, extend the pipe up nearly to the ceiling with good effect. The most certain way of heating both the warm and the cold sides of the house is to use a furnace, like Kohler's, with a double air-chamber, of which one division is exclusively devoted to the northwest rooms, and the hot air from it must go there. It is easier to direct the current from a furnace which has small radiating surface, and therefore heats the air very hot, as some of the wrought-iron furnaces, than from those whose radiating surface is large, and the air, although delivered in great quantities, not sufficiently heated to give it great ascending force. Much can, however, be done by rounding the elbows, and making the course of the warm air to the exposed room as easy as possible. C.

4. How to Proportion Chimney Flues. — It is impossible to give any rule for proportioning chimney flues, whose action depends on an infinity of circumstances. In general, air-tight stoves can bear the smallest flues, $4 \times 8$ inches being often given them. Open stoves need as much as $8 \times 8$ inches, and this is enough for a kitchen range, and will do, if the flue is smooth and straight, for an open fireplace not over 30 inches wide, or for a furnace flue, though $8 \times 12$ inches is better. A good-sized open fireplace needs $12 \times 12$ inches. Steam boilers absolutely require a large flue; $16 \times 20$ inches, or $12 \times 24$ inches, is not too large. All these suppose that the flues are vertical, so that by looking in at the fireplace one can see the sky above; when they are inclined or tortuous they must be at least one half larger, and must be made smooth inside, either by striking the joints smooth, or by pargetting. With these dimensions, flues carried well above the highest point of the roof, in a level country, will be sure to work well. If there are hills as high or higher than the house within a quarter of a mile, the probability is that no flue can be built which will work properly when the wind is blowing from them. The air seems to ascend the hill and pour over the crest in a cascade, which inevitably checks the ascending current in the flue, and no ventilating cap that I know will cure the difficulty. The effect of the hills shows itself at great distances. In Geneva all sorts of devices are resorted to to keep the chimneys in working order, although the mountains are miles away. The principle on which most of their flues are constructed is to give them two outlets, facing in different directions. When the wind is blowing down one, it is presumed that it will not at the same time blow down the other, and the air which descended by the first rises again and escapes by the second. It is always well to narrow the top of a flue slightly, and the throat is of course contracted. These two contractions keep the warm air between them from being mixed with cold air from above or below, and thus preserve its ascension force. C.

10. Hot-Air Pipes. — In a late number of the *Metal Worker*, the editor says he should want at least eight inches clear space all around a hot-air pipe from a furnace. He thinks that no insurance inspector would consent to running a pipe up in a stud partition. Now I would like to know how many furnace pipes in this region are eight inches from any woodwork? Consider that to enclose a ten-inch pipe with such a liberal space would make the outside of the enclosure three feet in diameter, say nine square feet, and the extra size of the house rendered necessary by carrying up second-story pipes in this manner would cost more than the furnace itself. For myself, I confess to having carried up numbers of hot-air pipes in four-inch partitions, and I venture to say that most architects have done the same. Of course, we should, if we had the whole control of the plan, manage to run all the pipes in closets or inferior rooms, where only plastered surfaces would be exposed to the heat, but when parties bring us a ready-made plan which they say "just suits them," and, on our suggesting that there is no place for the heating pipes, say that they do not wish their arrangement changed for such trifles, I do not see that we can be expected to do anything more than get the pipes into the partitions with as much care as may be If we can get the furring of a chimney-breast to carry hot air in, we may consider ourselves fortunate, and yet in this case there would seldom be more than two inches between the tin and the studding. For myself, I have been in the habit of specifying that all woodwork within two inches of the hot-air pipes should be covered with bright tin, tacked on, and of seeing that it was done, and would like to know, among the thousands of country houses built every year, how many are better protected, and in what way.

Architect.

## NOTES AND CLIPPINGS.

The Permeability of Building Stone. — The Buffalo *Commercial* gives the following account of an interesting experiment with building-stone in that city: "Yesterday Professor Doremus, of the Buffalo Medical College, performed a very interesting and instructive experiment before his class. A block of sandstone, such as is usually employed for window-caps and sills, and about twelve inches square and four or five inches thick, had a panel one half an inch deep sunk in each side. In each panel was fitted a block, which was perforated by a piece of common gas-pipe, and this was cemented about the edges. The whole was then coated with an impervious varnish. Air now entering the pipe on either side had access to the clean surface of the stone beneath the panel, and it was found that if the mouth be applied to the protruding pipe on one side, and a candle be placed in front of the opposite one, it could very readily be blown out by the air, which, with very little effort, was forced through the stone. When a rubber tube was connected with the house gas-pipe on one side of the stone, and a burner was attached on the opposite side, the simple pressure from the gas mains was sufficient to force the gas through the stone till it was lit at the burner on the opposite side. When by any means the pressure was increased, a very large flame was thus produced. This shows the permeability of building stone. Brick walls and the plastering of rooms are much more porous, and it is readily seen that unglazed tile, or stone, or brick sewers afford but little security against the escape of sewer-gas."

Zinc-Dust as a Cause of Fires. — A recent issue of the *Insurance Record* calls attention to the dangerous character of zinc-dust, which appears to be imported into this country in considerable quantities for use in certain branches of industry. The material presents the appearance of a gray powder, in an extremely fine state of division, and its use appears to be in the manufacture of paints. Chemically, it contains as much as forty per cent of metallic zinc-dust, the remainder being oxide and carbonate. Another variety of the same commodity, known commercially as slate-colored zinc oxide, contains really very little or no oxide at all, being almost wholly a metallic dust, which, in the process of manufacturing zinc-white, has escaped combustion, and is deposited in the flues of the condensing apparatus. These products, the *Insurance Record* points out, are extremely apt to cause mysterious fires, if precautions are not taken to keep them from contact with moisture; for, owing to its very fine state of division, this metallic dust, in the presence of moisture, will eagerly oxidize, and as this oxidation will be attended with a very considerable rise in temperature, the hydrogen gas evolved in the process may be inflamed, and, directly or indirectly, inflammable materials in the neighborhood may be ignited, and in this way the building or ship in which it happens to be stored may be destroyed, while the cause of the disaster may never be suspected. The *Record* points its moral by citing the case of the fire in the steamship Lord Clyde, in the year 1876, which at the time attracted some attention. The facts in this case were about as follows: A number of casks of zinc-dust were placed in the hold of the vessel, without any notice of the dangerous character of the material having been given to the owners of the ship. The casks, or some of them, by some means got wet, and within twelve hours after they had been put on board, the vessel was found to be on fire. When the source of the fire was discovered, the contents of one of the casks were found to be red-hot. As another contribution to the causation of what, for want of a better term, are called "spontaneous" fires, the facts above detailed are worthy of special attention.

A Triennial Salon. — It is said that the French Government have concluded to have triennial as well as annual *salons*. The triennial *salon* will be a recapitulation and selection, and made up of the best pictures exhibited at the annual *salons*. The counsel cannot and indeed do not wish to exclude a large number of meritorious works annually sent in, but on the other hand a more vigorous principle of selection has become necessary, and it has seemed possible that a solution of this difficulty might be found in the plan of holding every third year an exhibition of works carefully chosen by a competent jury from among those already submitted to the test of public opinion through the yearly *salons*.

Cremation. — A correspondent writing to the *Pall Mall Gazette* on the subject of cremation says: "But all this seems to me rather clumsy and tedious bungling. If we are not satisfied with the slow decay in mother earth, and must have a rapid mingling with the elements around us, why, with all our scientific advances, stop short at fire and furnaces? Would not electricity do it for us more neatly and expeditiously? I have seen surgeons disperse tumors with their wires almost magically; and it would be more decent and convenient if some Davy or Faraday reduced us between the poles of his battery to a little metallic button, or sent us into space like a Jablochoff candle."

Immigrating Architects. — The landing of twenty-two architects at Castle Garden last year shows, perhaps, that the hard times in this country are less repellant than the hard times abroad.